1948

The Food of Juvenile Leiostomus xanthurus and Roccus sa:xatilis taken in the York River

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-Methods-

The stomach contents of 37 spot and 40 rock taken in the York River over a five week period were examined and the organisms present were identified as nearly as possible. Most of the classification is from Pratt's Manual of the Invertebrates.

The stomach of each fish was disected out and examined individually. The contents were washed into a syracuse dish and examined with a binocular microscope. In counting the number of individuals the whole dish was examined if the contents were few, while one field was counted and the result multiplied by the number of fields when the number of individuals was large. The contents of each stomach was preserved in a 5% formalin solution.

Leiostomus xanthurus Lacepede

The spot is usually considered to be a bottom feeder. Evidence for this conclusion lies in two facts. The first is that the spot has an inferior, horizontal mouth, considered typical of bottom feeders; the second is that many bottom dwelling forms are found in the stomachs of these fish.

Hildebrand and Schroeder (1928) report that the food of spot 15 to 345 mm. in length consists of "Small and minute crustaceans and annelids, together with smaller amounts of small molluscs, fish, and vegetable debris...".

Hildebrand and Cable (1930) found in the examination of fish up to 25 mm. in length, taht copepods formed the principle food.

After 25 mm. had been reached a variety of detrital material was found, as well as a wider range of food. Sand grains were found in many of the stomachs. Twenty five mm. was also found to be the size at which spot attained a horizontal, inferior mouth and at which the schools of young spot broke up.

Welsh and Breder (1923) examined the stomachs of 50 spot ranging from 21 to 35 mm. in length, which were taken at random from a larger sample, and found that 72% of the volumetric percentage of the stomach contents were ostracods and only 8% were copepods. A variety of material constituted the remaining volume of food.

The data presented in tables I and II was gathered from spot ranging from 49 to 126 mm. in length.[1] Table I groups the stomach contents into their larger classifications, and lists the number of stomachs in which representatives of the group occur. Copepods occur in 29 of the stomachs examined, followed by polychaet worms in 13, ostracods in 9, amphipods in 7, isopods and gastropods in 5, and decapods, insect larva, and cumacea each in 2 of the stomachs examined. In practically all of the stomachs there were sand grains in varying quantities and in many cases it was noted that the intestine contained sand grains and detrital material when the stomach was virtually empty.

None of the papers previously mentioned broke down the stomach contents into smaller categories, so that a more direct comparison of food is not possible. Of the contents of the stomachs examined here the food of greatest bulk was polychaet worms, followed by copepods, amphipods, and isopods. Since no volumetric measurements were made, the listing of these organisms according to bulk is purely qualitative.

[1] Fork length to nearest mm.

In comparing the available data on the stomach contents of the spot it is immediately seen that spot from different samples vary somewhat in the type of food making up the principle part of the diet. Ostracods, copepods, and polychaet worms present at least two different types of food. Polychaet worms are found only on the bottom, while copepods and ostracods would tend to be found at varying levels, but not exclusively on the bottom.

There seem to be several explanations for the abundance of different types of food in these different samples. One is that the particular food organism was found most frequently by the fish while feeding. This tends to be brought out by the fact that in many cases the contents of a stomach will consist of a large number of one species (or several related forms) of one type of food, while other stomachs from fish taken in the same area contain an entirely different type of organism. Another explanation of varying food is that in different enviornments (shallow water, deep water, mud, sand, etc.) different food organisms are the dominant population . This view is not considered as tenable as the former.

From the evidence presented the following conclusions about the food habits of the spot are reached. The food of the spot covers a wide range, and evidently the form available at the time of feeding will be eaten in quantity. The spot is a fish that tends to feed on the bottom, but as Welsh and Breder (1923) point out, it may be considered as "....one of a species connecting the pelagic with the typical bottom feeder."

Roccus saxatilis (Walbaum)

The stomach contents of 40 rock[2] ranging from 35 to 96 mm. in length were examined. Data collected from these fish are presented in tables I and II.

Comparative data comes from Merriman (1941), who found that 3 striped bass[3] taken in the Parker River in Mass. had fed on Crago septemspinosus. Of 30 juveniles (110 to 230 mm. standard length) taken in the Delaware River near Pennsville, N.J., 19 had fed on fish of varying species, the rest being empty.

Townes (1937)[4] found that the fresh water shrimp (Gammarus fasciatus) formed about 60% of the food of juvenile fish taken in the Hudson River, with chironimid larvae the next most important item. A small percentage of the food was formed by fish, leptocerid larvae, and planktonic crustaceans.

Hildebrand and Schroeder (1928) found that the stomach contents of 48 rock from Chesapeake Bay consisted of fish, crustaceans, annelid worms, and insects, and ". . the young had fed on Mysis, Gammarus, annelids and insects."

The rock examined in the present investigation had fed largely on amphipods (mostly Gammaridea), decapods (Crago sp.) and fish. Table I shows that 17 of the rock examined had eaten amphipods, 11 had eaten shrimp, and 11 had eaten fish.

[2] Eight of these stomachs were empty.

[3] Length - 60 to 75 mm. standard length.

[4] Data from Merriman (1941)

From the data available it seems clear that juvenile fish early assume the voracious habits of the adults. Large crustaceans and fish make up the majority of food of fish between 25 and 100 mm.. The range of organisms utilized as food appears to be more restricted than that shown for the spot, and are of a somewhat different type. The fact that 8 (20%) of the stomachs examined were empty tends to bear out the observation by Merriman (1941) that the striped bass "...is apparently not a steady feeder, but may gorge itself over comparatively short periods of time and then stop feeding until its stomach is completely empty again." [5]

Page 52.

Table I

Stomach contents of 40 *Roccus saxatilus* and 37 *Leiostomus xanthurus* taken in the York River, July 10 to Aug. 7, 1948.

Food	Number of stomachs where found. Rock	Spot
Polychaeta		13
Gastropoda		5
Copepoda	8	18
Ostracoda		9
Cumacea		2
Amphipoda	17	7
Isopoda	1	5
Decapoda	11	2
Insecta (Larvae)	3	2
Teleostei	11	

Table II

Compiled data on the stomach contents of Roccus saxatilus and Leiostomus xanthurus.

Food	R. saxatilus			L. xanthurus		
Polychaeta				34		
Nereidae					4	1.4
Unidentified					17	2.5
Gastropoda				6	4	1.5
Copepoda	66			997		
Calanus sp.		8	6.75		8	4.1
Unidentified		8	1.5		29	34.3
Ostracoda				22	10	2.2
Cumacea				2	1	2
Amphipoda	51			30		
Gammarus sp.		3	1		2	5
Carinogammarus sp.		4	3.25		1	2
Caprella sp.		4	1.75		2	1
Gammaridea (Unident.)		10	2.6		3	2.33
Unidentified		1	2		3	3
Isopoda	1			14		
Sphaeroma sp.					4	3.25
Unidentified.		1	1		1	1
Decapoda	210			2		
Crago sp.		11	19		1	1
Unidentified.		1	1		1	1
Insecta (larvae)	10	2	5	2	2	1
Teleostei	11					
Menidia sp.		1	1			
Unidentified.		10	1			
Parasites						
Nematoda	45	5	9	466	23	20.26
Trematoda	14	3	4.66	3	2	1.5

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